

ACHIEVING FINANCIAL SUSTAINABILITY IN BIODIVERSITY CONSERVATION PROGRAMMES

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Presented to
Inter-American Development Bank Workshop on
Investing in Biodiversity Conservation
Washington D.C.
28 October 1996

1. INTRODUCTION

It is widely appreciated that insufficient investment is being made in conserving biodiversity, and that innovative approaches are required for generating the additional financial support required for implementing the Convention on Biological Diversity (Li, 1995; Newcomb, 1995; WRI, 1989). The need for additional resources arises from the imbalance between a country's need for capacity building and provision of basic infrastructure for conserving biodiversity on the one hand, and the ability of the country to mobilize resources on the other. Resources can be augmented through existing mechanisms such as the fiscal system, user charges, resource rent capture, and privatization, as well as through new mechanisms such as environmental taxes, betterment charges, and so forth. Even so, it appears that domestic resources in most developing countries will continue to be inadequate for financing the conservation of biodiversity due to the limited tax and capital base of many of these countries, their under-developed taxation systems and weak capital markets, and the need to divert resources to servicing foreign debt. Figure 1 lists reasons why external financial resources are needed for biodiversity.

The reasons for socially insufficient levels of investment in biodiversity include the lack of well defined transferable property rights, high transaction costs, differences between social and private discount rates, imperfect information, inappropriate political institutions, skewed political incentives, and bureaucratic inertia (McKenzie, 1995). Clearly, such problems cannot be solved by simply providing more funds. Instead, a combination of policy changes and new funding mechanisms is required.

The financial needs of individual countries for conserving biodiversity depend critically on what is assumed about national and international policies (Panayotou, 1995). Continuing to raise funds under current policy conditions, which include market failures and inappropriate incentives, will require unattainable levels of funding. This is the case because the world is currently spending about US\$1 trillion in direct and indirect subsidies of energy, water, agrochemicals, marginal agriculture, deforestation, and heavily polluting industries that lead to loss of biodiversity far beyond what would be happening without such subsidies. Without correcting these distortions, additional funding for biodiversity is likely to be futile. Indeed, removing or phasing out costly subsidies that distort the economy and lead to the loss of biodiversity may be the single most cost-effective way of financing investments in conserving biodiversity. As Panayotou (1995) says, "What is needed is reversal of the flow, not a march at a different pace towards the wrong direction".

Correcting these inappropriate policies could dramatically reduce the financial needs for conserving biodiversity. Further, both the policy reforms and the more appropriate determination of prices are likely to save financial resources and generate new funding, thereby further slowing the increasing need for additional resources.

FIGURE 1: WHY EXTERNAL FINANCIAL RESOURCES ARE NEEDED FOR BIODIVERSITY

- *Equity.* Many of the benefits of biodiversity flow to all citizens of the world, while the costs tend to fall on the countries with only limited financial resources.
- *Capital constraints.* Due to insufficient capital in at least some developing countries, external financing is needed to bridge the gap between the demand (both private and public) for biodiversity conservation and the domestic supply of funding to support that conservation.
- *Cash flow.* While many investments in conserving biodiversity will provide substantial benefits, these are often long-term and the full benefits may not be realized for many years, while the costs need to be paid today, necessitating long-term bridge financing which is difficult to obtain in developing countries.
- *Supporting policy reform.* Financing is often required to cushion the short-term impacts of policy reforms required to move toward sustainable use of biological resources, or to pay compensation to those adversely affected by the new policies, or to build consensus for the reforms.
- *Covering foreign exchange components.* Many investments in biodiversity may involve foreign exchange components, to build the confidence of investors and to leverage domestic sources of financing; generating foreign exchange by exploiting biological resources may be contrary to CBD objectives, while external investment may reduce the need for such exploitation.
- *Benefits.* Payment for conservation services provided to the global community by developing countries; or avoiding irreversible losses of biodiversity when countries are poor that may be highly valued after those countries become more wealthy.

This paper surveys the current situation, present trends, and promising innovations in the financing of biodiversity conservation. It describes each promising financial tool and the policies, technologies, and entrepreneurial initiatives required to make the tool successful. It estimates the importance of each tool, describes limits to its wider use, and identifies actions that could enhance that tool's leverage. It emphasizes innovative tools that are relatively poorly known.

This paper seeks to help the widest range of investors who could (and should) have a hand in crafting and using these tools. They include the full spectrum of those active, and potentially active, in biodiversity conservation: the international governing system; national governments; the private sector, both national and multinational; and NGOs, both local and international. The paper concludes with recommendations for IDB's role in biodiversity conservation, both through direct conservation financing and through actions in policy support, resource mobilization, and programme financing in natural resource conservation and management for biodiversity protection.

Investors need to be motivated by financial and political incentives to become active in financing biodiversity conservation (OECD, 1995; McNeely, 1988). Any effort to accelerate the identification and implementation of conservation finance need to be grounded in a better understanding of the incentives that motivate each investor.

2. SOURCES OF FINANCE AND POLICY LEVERAGE

Financial support for conservation has increased in recent years primarily through greater cooperation among six principal investors: the international community; governments; the private sector; international NGOs; and local NGOs.

Each of the categories of investors wields differential influence through their financial resources and through their role in formulating policies. Under the Convention on Biological Diversity (CBD), governments clearly have the lead role in formulating policies, being sovereign over their own biodiversity and responsible for the conservation and sustainable use of biological resources. The international community has considerable influence through the provision of funds through the Financial Mechanism of the Convention, currently the Global Environment Facility. The International Monetary Fund can have profound influences on policy through its structural adjustment loans. Donors such as IDB have influence primarily through choosing the activities in which they wish to invest. The private sector has significant influence through its patterns of investment. International NGOs can play an influential role in affecting policy, even though the financial means they are able to generate are relatively limited. Local NGOs are likely to be especially influential at the grassroots level, though their policy influence may be limited by a lack of financial and human resources.

An example from recent efforts to mobilize financing for conservation will serve to illustrate how the relationships among the different actors work. During the debate in the US over ratification of the North America Free Trade Agreement (NAFTA), the US and Mexican governments were anxious to gain support for NAFTA from the US environmental community. Consequently, this community, especially the US-based international NGOs, were able to turn this political need into a substantial commitment to biodiversity conservation in Mexico. The US and Mexican governments pledged US\$30 million to a biodiversity foundation in advance of the treaty vote; at least part of this funding will go to support local NGOs in Mexico.

Bank loans to developing countries have averaged about US\$21 billion annually during the 1990s, though banks have continued to give emphasis to improved profitability and containing risk. In contrast to bank financing, private (non-bank) market financing flows to developing countries have continued to increase in the form of bond financing and equity capital. These total around \$20 billion per year. Foreign direct investment from multi-national corporations totalled \$56 billion in 1993. In 1992, private flows and grants by non-governmental organizations increased by \$4.8 billion to \$16.6 billion (CSD, 1994). Relatively little of this funding has gone to biodiversity, and indeed at least some of it may have been spent in ways that served to reduce biodiversity. But the quantity of such flows indicates that changes in investment policies to make them more supportive of biodiversity could have a profound influence.

The private sector's potential is the least tapped. Most of the tools that require the private sector are being led by international businesses. But as national companies or subsidiaries of multinationals gain more resources, the potential of their role will grow both in partnership with international companies and on their own. The challenge is how to form partnerships between relevant government agencies and the private sector, drawing on lessons learned from experience with these partnerships in both developed and developing countries (Jennings, 1995).

Canada and the USA have a long tradition of corporate and private support for social and community needs. Tax laws were written specifically to encourage corporate charity by giving corporations and individuals tax deductions for contributions of cash, property, and services to non-profit organizations that fit broad criteria for public service. In recent decades, corporations have learned that they can benefit in other ways from being "corporate good citizens." Many corporations engaged in the production of goods and services see their charitable activities as giving them as much public relations value as paid advertising; others will see investments in biodiversity as being sound business decisions which yield benefits in terms of ensuring supplies of raw materials, access to markets, and long-term social, political, and economic stability.

Both a medium-term analysis of where growth in economic and political power will come, as well as a long-term analysis of where the conservation challenges will lie, point to the for-profit private sector as key actors. The analysis of tools that follows seeks to identify as many ways as possible to build bridges between those investors currently committed to conservation and those who could become so within the short to medium term.

The field of biodiversity financing is in ferment (Panayotou, 1995). The number of ideas being tried is large; yet even greater is the number of ideas being seriously considered. This paper arranges these ideas by "point of entry" -- that is, the investor and the actions that are likely to lead to implementation. Note that the point of entry is not necessarily synonymous with the location of money or policy leverage. It is likely that a combination of investors and partnerships will be necessary.

3. FINANCING BIODIVERSITY: TOOLS THE INTERNATIONAL GOVERNING SYSTEM CAN INITIATE

The international governing system -- involving the United Nations system, the World Bank, the regional development banks, the International Monetary Fund, and international conventions -- has the lead responsibility to generate additional funding at the global level, drawing on the surplus generated in a global economy. The UN system may need to develop more effective institutions with a mandate for generating additional sources of finance for dealing with biodiversity, a global public good.

The Global Environment Facility, operated by its own secretariat and implemented by the World Bank, United Nations Development Programme, and the United Nations Environment Programme, is the interim Financial Mechanism of the Convention on Biological Diversity. The GEF allocated over US\$300 million to biodiversity in its pilot phase and has doubled its level of investment in its first three-year implementation phase. These funds are being spent subject to an Operational Strategy developed by the GEF Secretariat, which in turn was based on direction provided by the Conference of the Parties of the CBD. The GEF is supporting a wide range of project initiatives in many countries, at least some of which involve innovative funding mechanisms which will be discussed in more detail throughout this document.

As just one example, with GEF support the World Bank has greatly expanded the basis for understanding the effectiveness and economic efficiency of biodiversity conservation trust funds. Eleven funds -- including trusts, endowments, and sinking funds -- are being supported through technical assistance for their design and training for their administration. Five of these -- Bhutan, Peru, Uganda, Trans-Carpathian, Brazil -- have or will soon receive substantial GEF funding of their principal. Four more -- Thailand, Guyana, Benin, and Zambia -- are in the concept stage (see 7.3 and 7.4 for more details).

But it is also clear that the funding generated by the GEF will not be sufficient to meet all of the needs for investments in conserving biodiversity. Additional funds are required from the international level. At least some of this funding should also serve to stimulate increased investment at the national level (as discussed in more detail in section 4).

The globalization of the marketplace, enabled or facilitated by the international governing system, has led to numerous transnational economic activities that depend on global resources to generate increasingly vast streams of income and other benefits which do not accrue through rents or returns to the appropriate factors of production. Correcting this market failure through tapping a small part of these streams for purposes which provide global benefits could result in a more logical and efficient allocation of global income (though the failure may not be simply that of the market). This section suggests a few possibilities.

3.1. Charging for Use of the Global Commons

The global commons is that part of our planet which belongs to all of humanity. It includes the oceans beyond the exclusive economic zones, the ocean floor, outer space including the geostationary and lower orbits, the electro-magnetic spectrum, and biodiversity (in its general sense). These global commons have considerable economic value. The oceans provide nearly 90 million tons of fish per year, serve as a means of transport, help regulate the climate, and are a major carbon sink. Outer space provides the traffic lanes for satellites which enable global communications to be so efficient, and which provide masses of data on natural resources. The electro-magnetic spectrum serves as a means of international telecommunications, without which the global market would be difficult to imagine.

The global commons continue being misused or over-used, at least partly because they are still perceived as "free" resources. Bezanson and Mendez (1995) point to the need to manage the global commons and to charge for their contributions to the various transnational activities that use them. They call for a system of user rights, regulations, rents, and charges as a way of governing the commons and using them to generate revenues. At least a portion of these revenues should be allocated for conservation purposes, perhaps through payments directly to the Financial Mechanism of the CBD.

Clearly, the use of the global commons is a major political issue, but it already is generating significant economic benefits. The challenge is to find ways to ensure that those realizing benefits also pay at least some of the costs of conservation.

3.2. Joint Implementation

As outlined in the UN Framework Convention on Climate Change, the basic premise of Joint Implementation (JI) is to enable voluntary cooperation between two or more countries with the aim of reducing greenhouse gas emissions as cost-effectively as possible. In most cases, JI projects will involve countries where mitigation costs are relatively low in order to maximize the possible global benefits, enabling countries with high marginal costs to invest in countries where greater reduction of greenhouse gas could be achieved for the same level of funding; JI offers countries with limited or expensive mitigation options the opportunity to pursue more cost-effective mitigation opportunities elsewhere, thereby dramatically reducing the costs of achieving a given net reduction in carbon dioxide emissions. The COP of the Climate Change Convention has insisted that Joint Implementation financing is to be additional to the financial obligations of industrialized countries and existing official development assistance flows, reinforcing the crucial role of the private sector in any success the Joint Implementation system is to enjoy (Trexler, 1995). The effects of such investments on biodiversity could be significant.

On the positive side, any efforts to slow climate change will likely be a net benefit for biodiversity. More specifically, the activities being implemented may be managed to provide significant benefits for biodiversity; for example, funds invested by an industrial country for carbon sequestration in a tropical country may involve reforestation with native species of trees, thereby expanding the area of habitat and contributing to the maintenance of biodiversity (Figure 2). While it is generally agreed that forestry-based mitigation efforts are only a relatively small part of the climate change mitigation portfolio, they are worth mentioning here because of their potential impact on biodiversity.

Two categories of JI projects may have especially significant impacts on biodiversity: carbon sink enhancement; and changing agricultural practices. Enhancing carbon sinks involves the reduction of net anthropogenic releases of carbon through carbon fixation in biomass or changes in land use and management practices. Such so-called "carbon offsets" have the potential to modify and improve management practices, to the benefit of biodiversity. Options for mitigating climate change include slowing deforestation through improved forest protection and slowing of conversion of forest to agricultural land; and increasing forest and tree cover on existing lands, thus enlarging living terrestrial

FIGURE 2: SUPPORT FROM JOINT IMPLEMENTATION FOR BIODIVERSITY

While Joint Implementation is designed to help implement the Climate Change Convention, well-designed JI projects can provide significant benefits to biodiversity. Examples include:

- rehabilitating and protecting of important watershed areas;
- reducing the extent and frequency of illegal logging in protected areas by increasing the capability and effectiveness of management;
- involving local populations in such activities and provide alternative sources of timber;
- regenerating and rehabilitating forests in biologically valuable habitats;
- purchasing land to add to protected area systems in areas of biologically-rich forest.

carbon reservoirs. The rate of on-going forest loss suggests that significantly slowing or stopping deforestation in the coming decades would probably have a more sizeable and immediate impact on the accumulation of carbon dioxide in the atmosphere than any conceivable tree-planting effort, with forest conservation plausibly keeping tens of billions of tons of carbon out of the atmosphere over the next several decades (Trexler, 1995).

Figure 3 lists several carbon offset projects in Latin America with significant implications for biodiversity, generating some US\$13 million in funds which could help conserve biodiversity. For example, despite some of the administrative and practical challenges of Joint Implementation, the sources of funding may be significant and will be largely outside of the usual sources of funding available for biodiversity.

A significant new flow of financing from offsets for the management of natural forests will require substantial new research on tropical forest management in order to make the investments credible (Sedjo *et al.*, 1991). In addition, research on the energy consumed in wood processing will be needed. For example, the best (in terms of carbon offset potential) use of wood is in structural materials for construction -- specifically wood products designed to replace concrete and steel, which are energy intensive to make. For this option to grow will require an almost unprecedented coordination of policy, technology, science, financing and business to realize the full offset potential. Note that this use of financing from carbon offsets will lead to economic development in tropical countries -- a feature bound to make it more attractive politically.

The negative side to JI is that deforestation processes in the tropics are highly complex and difficult to control under even the best of conditions. It is also difficult to quantify carbon benefits from indirect protection measures and to ensure the retention of carbon over the long term. Further, the benefits gained by enhancing carbon reservoirs in the tropics will be negated if energy consumption based on fossil fuels continues to increase rapidly in the industrialized countries. Developing countries understandably have little interest in seeing foreign assistance used to subsidize continued consumption of fossil fuels in the industrialized countries.

Many international environmental groups and developing country governments continue to express scepticism about allowing carbon dioxide emitters to avoid emissions reductions by relying on carbon offsets and Joint Implementation (Sierra Club, 1995). Others have voiced the fear that pursuit of forestry-based Joint Implementation projects could turn entire countries into forest reserves and national parks (Trexler, 1995). Another problem is that the international forestry and natural resources communities have not actively participated in the climate change negotiations, so an anti-forestry bias has emerged in discussions on Joint Implementation. Sceptics question whether individual areas of forest otherwise would have been cleared. Crucial questions which need to be asked include: Can forest areas truly under threat of loss be identified? Once they are identified, can they truly be protected? How does one prove that exploitative pressure has not simply been displaced to another parcel, with no net carbon implications? Clearly, Joint Implementation needs to be seen as just one part of an overall approach to improved forest management, and conservation of biodiversity.

FIGURE 3: CARBON OFFSET PROJECTS WITH SIGNIFICANT IMPLICATIONS FOR BIODIVERSITY (Modified after Phantumvanit, 1995, and Trexler, 1995)

Project Name	Participants	Location/Area	Offset Costs	Start Date
A. Forest Protection Management				
1. Rio Bravo Conservation and Forest Management	Wisconsin Electric Power Co., The Nature Conservancy and Program for Belize	Belize c.56,000 ha	US\$2.6 mill	Feb. 1995
2. CARFIX	FUNDECOR, Costa Rican Ministry of Natural Resources, Energy and Mines, Wachovia Timberland Investment Management	Costa Rica 91,000 ha		Feb. 1995
3. ECOLAND	Tenaska Inc., Trexler and Assoc. Inc., National Fish and Wildlife Foundation, COMBOS, Costa Rican Ministry of Natural Resources, Energy and Mines, Council of the OSA Conservation Area, Rainforests of the Austrians	Costa Rica 2-3000 ha	US\$900,000	Feb. 1995
5. Mbaracayu Conservation Project	Applied Energy Services, The Nature Conservancy, FMB Foundation, USAID, IFC	Paraguay 65,000 ha	US\$2 million	1990
5. OXFAM America Amazon Project	Applied Energy Services, OXFAM America, COICA, various indigenous groups	Peru, Bolivia, Ecuador c.550,000 ha	US\$3 million	1993
B. Increasing Forest and Tree Cover				
6. Guatemala Agroforestry Project	Applied Energy Services, CARE, Guatemala Govt., US Govt.	Guatemala 78,450 ha (planting) 19,200 ha (protection)	US\$2 million	1988
7. Profafor	FACE Foundation, Ecuadorian Forestry Service	Ecuador 75,000 ha	US\$3.33 million (max.)	June 1993

Ultimately, the success of Joint Implementation funding in the forestry sector will be measured by the contribution it makes to national objectives in the field of biodiversity. Experience to date indicates that Joint Implementation funding has fostered improved management practices which have had a positive impact on biodiversity (Phantumvanit, 1995). Trexler (1995) concludes that biodiversity conservation can be a legitimate and valuable offshoot of a climate change mitigation portfolio that includes a forest conservation element. The biodiversity community has a major stake in seeing that this comes about, but it is largely up to them to address the difficult policy and technical questions that will enable biodiversity concerns to be included in the climate change discussions.

While Joint Implementation funding is relatively limited, it could be used to leverage improved forest management that would have significant positive impacts on biodiversity. Those interested in biodiversity in forests are now in a position to use Joint Implementation to explore innovative funding arrangements and develop their response to future financing regimes. If carbon can be traded successfully for forest development capital, then other forest services could be traded under future international regimes.

As in most projects, the success of JI depends very much on project design and implementation. It is not enough simply to pour in more funds if the project ignores important social, cultural, and political elements of forest management.

3.3. International Taxation

International taxation of transnational activities is justifiable because such activities use the global commons and often cause negative externalities such as environmental pollution; they are essentially free riders on the global governance system. A very small tax on international trade, again made possible by new technology, could generate vast amounts of funding because the annual volume of international trade is in the neighbourhood of US\$38 trillion (thousand billion) (based on 1992 figures). International tourism is a special form of international trade that might be relatively easy to tax. An air transport tax would be a practical application of the "polluter pays principle", seeking to discourage air pollution by internalizing the harmful effects of air travel on the environment and collecting funds that could be used for ecologically-oriented remedial measures, including for ozone depletion.

Owen Stanley (1994) explores the possibilities of an environmental tax on air transport, such as through a tax on air transport fuel (which is strenuously opposed by the airlines industry, quoting low profits and fragility of the airline system). Still, air transport, including airfreight and passenger traffic, is growing at a rapid rate of well over 6 percent per year. A one percent tax on the price of all passenger tickets on scheduled routes would have provided about US\$1.7 billion in 1993, with the G7 countries producing more than three-quarters of this amount. If the toll were only for international flights, the revenue generated would have been US\$800 million in 1993. However, the air transport tax has several significant drawbacks. It is difficult to identify a cause and effect between air transport and environmental damages, targeting the airline industry rather than other polluting industries may be unfair and potentially detrimental to the growth and integration of the global economy, and a multilateral mechanism would be required for redistributing the funds generated by such a tax (though of course the Financial Mechanism under the CBD could meet the last requirement).

Bezanson and Mendez (1995) suggest that activities with negative international externalities such as ocean dumping and other marine pollution, military expenditures and arms transfers, are also possibilities for international taxation, both for correcting market failures and for generating revenue. However, it should be noted that the US Congress is strenuously opposed to any form of international taxation, so the likelihood of significant funds generated through this mechanism seem to be relatively low, at least for the time-being.

3.4. Generating Funds From the Trade in Tropical Timber

Barbier (1995) suggests a role for new tropical timber trade policies in fostering trade-related economic incentives for sustainable forms of management which will encourage the conservation of biodiversity. OFI (1991) has recently argued the case for a tax transfer of revenue on the trade in tropical timbers, because royalty revenues to producer country governments from tropical timber are often low in relation to the consumer value of products; revenues from taxes on imported tropical timber products accruing to consumer governments are relatively large; and a relatively modest reduction in the rate of taxation at the consumer end of the chain would allow a reasonably large increase in the stumpage value of the resource without affecting the end price.

One study by the Netherlands Economic Institute (NEI, 1989) has indicated that a one to three

percent surcharge on the tropical timber imports of the EEC, Japan and USA would raise between US\$30 to \$90 million with little additional distortionary effects.

A significant drawback to any such revenue transfer schemes is that they would require an internationally agreed monitoring and enforcement system to ensure that producer countries did respond by raising royalty fees and invested the resulting revenue in improved management of forests. Few tropical countries would welcome such external supervision with their internal affairs and could argue that it is inconsistent with the sovereign rights over their resource base agreed under the CBD.

Sedjo, Bowes and Wiseman (1991), recognizing the reluctance of governments to impose additional taxes, call for the establishment of a global system of marketable forest protection and management obligations (FPMOs). Under a voluntary global forestry agreement, FPMO would be distributed to all signatories, for example, through criteria based on a mix of GNP levels and forest area. Holders of an FPMO must either fulfil the obligation on the ground or induce another agent to assume the obligation, in exchange for a payment. Thus countries with large obligations and small forests would have "excess" obligations, and hence be forced to meet these externally, while countries with large forests and small obligations could meet them internally but would then have an "excess" of forests; they could then enter into negotiations with countries that had "excess" obligations and might be willing to purchase FPMOs.

This system has advantages over simple transfers in that it provides incentives for nations to comply out of their own self-interest; it would ensure that industrialized countries bear a substantial portion of the costs; and it would not excessively limit production of traditional and commercial forest products. It would, however, require considerable monitoring and a "clearing-house" for international trade in permits, as well as a service for negotiating the comprehensive international agreement to establish the system. But it is possible that a demonstration system involving only a few major industrialized and tropical forest countries could show how the concept could be put into practice.

Barbier (1995) concludes that innovative mechanisms for financing sustainable management of tropical forests, international compensation for biodiversity conservation, and trade-related incentives for efficient and sustainable management of tropical forests will be three critical and complementary components of any comprehensive global strategy for biodiversity conservation.

4. FINANCING BIODIVERSITY: TOOLS GOVERNMENTS CAN INITIATE

The Convention on Biological Diversity recognizes that each government needs to provide financial support and incentives to implement the objectives of the CBD, within the capacity of each government (Article 20). All governments have conflicting demands on the available financial resources, and will need to ensure that expenditures in support of the CBD are able to compete successfully with other demands for the limited funds available. This section will discuss several new approaches to generating funds that will serve to support the objectives of the CBD, even if the funds generated are not directly provided to the government agencies assigned to implement the Convention. It is clear that many governments can use policy instruments to change the ways that funds are being raised and spent in order to make them more consistent with the CBD. Many of these "green funding mechanisms" can both generate funds and change behaviour of individuals and institutions to make them more "biodiversity-friendly".

It is sometimes contended that much of the value of biodiversity is primarily global, but this is due largely to a lack of domestic appreciation of the full values of biodiversity to the country involved.

4.1. Environmental Taxes and Charges

CSD (1994) points out that conventional taxation systems throughout the world tax work, income, savings, and value added and leave untaxed (or even subsidized), leisure and consumption,

resource depletion, and pollution. The implied reduced incentives for work, savings, investment, and conservation and increased incentives for leisure, consumption, resource depletion, and environmental degradation result in more environmental degradation than would have been the case had incentives been the reverse. Therefore, a reform of the fiscal system that would reduce conventional taxes and replace them with environmental taxes -- so as to leave the total tax burden unchanged (revenue neutral) -- would bring the economy closer to sustainable development by stimulating economic growth and resource conservation and discouraging resources depletion and environmental pollution. Fiscal reform would save government expenditures on environmental regulation and pollution abatement and it would indirectly advance the objectives of Agenda 21.

Costa Rica offers a precedent-setting example of the use of one kind of effective charge that serves to benefit biodiversity: a water user fee (Repetto, 1986). The idea is to levy a tax on the use of water by utilities and irrigation districts and apply that tax to the maintenance of forested watersheds. The government is considering charging approximately \$6 million/year to the national water company and \$3 million/year to the national electric power company. These fees would yield an income of approximately \$7/hectare/year for management of the 1.3 million hectares of forest land in watersheds.

Another possibility is a differential land use tax, which could provide a scale of taxation ranging from the most environmentally benign, such as a natural forest, to most inimical to biodiversity, for example, an industrial site or a parking lot. A charge would be imposed on a land owner who changes land use from a higher to a lower class, with greater charges for greater changes between the levels of the classification.

The potential for environmental, or "green" taxes is great in many countries (Broadway and Flatters, 1993; Bruce and Ellis, 1993; OECD, 1993b; Barde and Owens, 1993). A carbon tax already has been collected on the use of fossil fuels in Denmark, Finland, the Netherlands, Norway, and Sweden. Other uses of tax policy could also contribute. Governments could decide to provide tax deductions to private landowners trying to preserve biodiversity on their own lands, as is already being done in Australia, Canada, and several African countries (McNeely, 1993). Such a tax deduction would help mitigate costs of habitat conservation, including opportunity costs.

It might also be possible to reduce or eliminate taxation on ecologically important land where the owner commits to conserving it in its natural state (Clark and Downes, 1995). On the other hand, taxes could be increased on activities that lead to the loss of biodiversity, thus helping to ensure that the costs of environmental damage are internalized.

Business opposes proposals to tax the sales of pharmaceuticals, timber, or seeds, contending that as taxes are unhypothecated, the revenues will have little to do with achieving efficient conservation results, and additional revenues would more appropriately be levied from society as a whole. Irrespective of the merits of these arguments, the political reality is that the introduction of such taxes is unlikely under current conditions in most countries (ten Kate, 1995).

Simpson (1995) offers several arguments against taxing profits arising from biodiversity prospecting (see 6.2.). First, at least some of the benefits of biodiversity accrue to society as a whole rather than to new-product researchers, so it is only fair that society as a whole should pay for conservation. Second, it is widely accepted that public goods -- of which biodiversity is certainly one -- should be financed from broad-based taxes based on the principle of minimal allocative distortion; supporting biodiversity conservation with revenues from biodiversity prospecting would appear not to meet this criterion. And third, if the intention is to provide incentives to local people, it may be that direct payment schemes for implementing conservation would be more efficient than establishing biodiversity prospecting operations.

Repetto *et al.* (1992) analyzed a wide range of environmental charges, including effluent charges on toxic substances and vehicle emissions, recreation fees for use of the national forests and other public lands, product charges on ozone-depleting substances and agricultural chemicals, and the reduction of subsidies for mineral extraction and other commodities produced on public lands. This sample of potential environmental charges in the US would reduce a wide range of damaging

activities while raising over \$40 billion in revenues. Recreation fees in national forests, for example, could yield US\$5 billion in revenues. These findings refute the argument that environmental quality can be obtained only at the cost of lost jobs and income. Instead, providing a better framework of market incentives by restructuring revenue systems can simultaneously improve environmental quality and make economies more competitive. Environmental charges would tax people on their use of energy, amenities, and the amount of waste they generate rather than on their salaries, property, and profits. Environmental charges would give people an attractive incentive for savings. At present, the only way most people can reduce their tax bill is to work less and earn less income. Environmental charges would give them the option of reducing their tax bills by acting on their principles -- by saving energy, recycling, or bicycling to work. "Virtue is its own, but not necessarily its only, reward," say Repetto and his colleagues.

The main barrier to the wider use of these taxes and fees in supporting biological diversity conservation lies in the mismatch between locations of habitats containing high levels of biodiversity (often protected areas in remote areas far removed from the mainstream of national economic activity) and users who can afford to pay a meaningful fee. Thus, governments will need an additional incentive to apply fees across watershed boundaries. One such incentive can come from the value of a reputation as a pioneer in this field. The first few countries that make a serious attempt to implement a water-based fee system for support of forest management and conservation, for example, will likely see additional donor support.

While taxes are predictably unpopular with politicians, green taxes such as those on energy, agrochemicals, logging, and land use could make a significant contribution to conserving biodiversity. Combined with limited and targeted subsidies for activities with significant public good aspects or positive externalities such as conservation of biodiversity, these measures could reduce significantly the financing needs even if no additional revenue is generated (Panayotou, 1995). Finally, taxes and charges have an impact on trade and competitiveness, so the gradual introduction of economic instruments for internalizing costs should be considered a crucial part of economic development.

4.2. Tradeable Permits

Considerable work is being done on tradeable permits, an approach that has been developed recently for controlling carbon dioxide emissions (UN, 1995; Hahn and Hester, 1989; Panayotou, 1994). Among incentive-based policies, the choice between charges and tradable permits depends partly on the capabilities of regulators. Although tradable permits have been used for control of air and water pollution in the US and for fisheries in New Zealand and have been suggested for restricting emissions of greenhouse gases, they tend to be more administratively demanding than charges because the latter can typically be implemented through the existing fiscal system. Still, tradeable permits offer considerable potential for generating funds for conserving biodiversity (Sedjo, Bowes, and Wiseman, 1991).

Swanson (1995) suggests an approach to contracts for biodiversity which would entail the acquisition of the rights to particular land uses that are especially detrimental to the supply of biodiversity. For example, Schneider (1992) suggests that the supply of biodiversity from the Amazon could be ensured only if the "burning rights" were acquired from local users, suggesting that a contract for the transfer of rights to clear and burn the lands in the Amazon Basin would ensure the supply of biodiversity demanded from that region. Land owners, according to this approach, could be induced through contractual agreements to transfer such rights, and if these rights were freely transferable, then economic theory suggests that the optimal distribution of land uses would result. So long as all of the uses of a given area are valued, the property rights approach allows for the allocation of land uses between the various competing users (Pearce, 1992).

As summarized by Swanson (1995), a form of property rights could, theoretically, efficiently allocate the various rights of land use between the interested parties. If the various services flowing from the ownership of a parcel of land could be identified, then the people who wanted biodiversity

would simply acquire the rights from those who are able to supply it. However, he points out, the practice of transferring development rights differs quite considerably from the theory.

Panayotou (1995) has also proposed the idea of internationally Tradeable Conservation Credits (TCC) as an instrument for widening the market for biodiversity values beyond their direct use value to extractive industries. Recent work on the value of biodiversity (e.g., Pearce and Moran, 1994; Barbier *et al.*, 1994) indicate that the indirect use value and non-use values of biodiversity generate far greater willingness to pay by the general public than the use values implied by the rather thin market in bioprospecting. However, no marketable instrument is currently available for capturing these non-use values other than voluntary contributions to NGOs.

As conceived by Panayotou (1995), tropical countries could allocate habitats for biodiversity conservation and divide each habitat into a number of TCCs of a particular size. Each TCC would state the location, condition, diversity, and degree of protection of the habitat and any special rights that it conveys to the buyer or holder. TCCs could then be offered for sale both locally and internationally at an initial offer price that covers fully the opportunity costs of the corresponding land unit plus an appropriate mark-up. The potential buyers of TCCs include local and international organizations, local and international foundations, and corporations, developed country governments, chemical and pharmaceutical companies, scientific societies, university and research institutions, and even individuals in the developed countries who are conservation-minded.

Motivations for purchasing TCCs would vary among the prospective buyers, ranging from direct use values such as prospecting for new chemicals or pharmaceuticals, to non-use values such as conservation or tourism. Others might buy and hold TCCs as an investment, if they expect them to rise in value as a result of decreasing supply and increasing demand for biodiversity in the future.

Developed countries could stimulate the demand for TCCs by providing credits to domestic firms and property owners for the acquisition of TCCs from developing countries against domestic environmental regulations such as forest harvesting and replanting regulations, or by introducing a conservation tax and then allowing people the option to pay this annual tax or to purchase and hold TCCs from conservation in lieu of the tax. A TCC could involve declaring a fragile ecosystem as a protected area which is closed to certain agricultural practices or forms of development, obviously with the consent of the communities involved because they would gain economic benefits from behaviour which is in the national and global interest. This financing mechanism has the great advantage for the conservation of biodiversity in the tropics of making the opportunity costs clear and providing a vehicle for the beneficiaries to pay them. Panayotou (1995) considers that it has the potential to raise billions of dollars for biodiversity without compromising national control and sovereignty over resources.

4.3. Privatization and Property Rights

It is clear that insecure property rights over natural resources have been a major factor in the loss of biodiversity, leading to under-investment in land improvement, soil conservation, tree planting, and other long-term investments which foster the maintenance of biodiversity. Such lack of investment in turn leads to low agricultural productivity, low farming incomes, and clearing of forests to obtain additional land for cultivation. Secondary effects include low tax revenues and high public expenditures on poverty alleviation, forest protection, and mitigation of off-site effects such as the sedimentation of dams and reservoirs (Panayotou, 1995).

It is clear, then, that considerable gains for biodiversity could arise simply from changes in government policy on property rights. Such changes could generate additional tax revenue, but more important, could reduce the need for governments to undertake expensive conservation activities that could be more efficiently carried out by local communities acting in their own interests. Such mechanisms are likely to be especially useful if they are implemented in coordination with other mechanisms such as tradeable permits and tax incentives (discussed above).

However, the assignment of property rights is not always a good instrument to accomplish environmental policy objectives, because it could create a local monopoly, or it may be impossible

for a private owner to monitor the use of the resource by others and therefore charge the appropriate price. Also, many of the values of biodiversity have a "public good" quality to them so it is not efficient to charge prices for enjoying some of these values. An example is a watershed that serves a large and difficult-to-identify downstream population.

While all governments have many competing demands on their funds, the mechanisms discussed in this section suggest that new forms of raising revenue could be beneficial to biodiversity even if the funds are used to support quite different sectors of the government. The intention of the mechanisms discussed in this section is to ensure that the power of government taxation and policy-making is used to support the objectives of the CBD and the general public.

4.4. Debt-related Measures

The total government foreign debt of all developing countries, taken as a group, reached US\$1.8 trillion at the end of 1993, an increase of 7 percent from the previous year. The World Bank estimated that as of the end of 1994, the debt will increase by another 7 percent, reaching US\$2 trillion. Bilateral creditors include several IDB Members: USA, Canada, Argentina, Brazil, Mexico, and Venezuela. While these countries understandably are not keen to write off the debt entirely, they may be interested in arrangements by which at least some repayments could be made.

Various approaches to debt relief, such as debt rescheduling, debt-for-equity, or debt-for-nature swaps (discussed further in section 7.1.) have contributed to a reduction of the outflow of financial resources from developing countries and can continue to make contributions to external financing for those countries which are actually servicing their debts. In this regard, debt-for-policy reforms or debt-for-sustainable development may have a greater promise than the narrowly conceived debt-for-nature swaps.

An example of debt-for-policy arrangements is the Enterprise for the Americas (EAI) programme, which links forgiveness of bilateral debt held by the US government to policy reforms -- mostly to do with regulations and laws that promote a market economy (Gibson and Shrenk, 1991). In addition, the agreements mandate the creation of a fund capitalized by local currency bonds issued by the Central Bank that pay off over an extended period of time. Other G-7 countries have announced debt forgiveness programmes; Canada and France are in the process of developing similar package deals. Switzerland has a sophisticated debt reduction facility (Blesse-Venitz, *et al.*, 1995).

A limitation in the view of some environmental organizations is the EAI's requirement that an EAI agreement can only be achieved after a country has accepted an IMF prescription for their economy. Many groups object that such agreement ("conditionality") leads to both social and environmental stress.

Clearly, donor governments and agencies have numerous other financial mechanisms available to them, not least being direct provision of funding to activities that implement the CBD. Such direct interventions are often the most efficient and effective, but are not discussed here because they have now entered the mainstream of donor behaviour. Such donor investments in biodiversity-related activities probably exceed US\$10 billion per year, with virtually all of this on a donor-to-government basis rather than through the Financial Mechanism of the CBD; governments no doubt consider this a more politically-acceptable and efficient way to operate.

5. FINANCING BIODIVERSITY: TOOLS THE PRIVATE SECTOR CAN INITIATE

In 1993, private financial flows to developing countries reached US\$159 billion (ten Kate, 1995), far more than the \$56 billion in development assistance. The private sector has profound influences on biodiversity through its use of resources, trading patterns, and marketing. Many private-sector investors are already deeply involved in biodiversity, holding extensive areas of land important for conservation, promoting bioprospecting (see below), carrying out biodiversity-related research, and supporting conservation efforts in the field. Exxon, for example, has recently made a US\$5

million grant to support conservation of the tiger in Asia (its advertising symbol). Many industries are becoming much more "green" and therefore useful potential partners in biodiversity.

This trend is most strongly seen in the industrialized countries, but many developing countries are seeking to promote rapid economic expansion, with the consequences that: 1) the local business sector will increasingly have the resources to contribute to conservation; and 2) the emerging consumer class will have the interest, influence, and resources to support national conservation efforts. This assumption leads to a focus on identifying incentives for the for-profit private sector to play a greater role in the financing of conservation. Already, many commercial, investment, and private banks have contributed to environmental initiatives in the past few years and should be considered as a source of loan funding. While confidentiality makes it difficult to specify the precise financial resources involved, the fact that banks are seriously considering environment-related investments can be considered encouraging. For example, a recent survey by UNEP indicated that 88 percent of the banks responding said that they either already invest in environment-related firms or expect to do so within 15 years (UNEP, 1995). This section discusses some of the potentials for biodiversity funding from the private sector. If the private sector can become a full partner, then the world could see a new era of conservation -- an era in which civil societies have the will and the means to assume an effective stewardship over their own resources, biodiversity included.

Already, the International Chamber of Commerce (ICC), the World Business Council for Sustainable Development (WBCSD), Keidanren in Japan, and many others are channelling substantial private sector resources to provide business leadership for change towards sustainable development and to promote the attainment of high standards of environmental and resource management in business. Many individual companies are working on innovative approaches to ensuring that their activities preserve fragile ecosystems, even when mineral extraction is involved.

5.1. Transfer of Development Rights and Credits

The real potential of JI (as discussed in Section 3.2) as a funding source for biodiversity conservation projects lies in the private sector of industrialized countries, including electric utilities, automobile manufacturers, and chemical manufacturers who may find the potential cost-effectiveness of carbon offsets to be an attractive alternative to facility-specific emissions reductions (Trexler, 1995).

5.2. Prospecting Rights and Biological Royalties

Conservationists have long cited the untapped potential of rainforest species for yielding useful drugs as a reason for saving tropical forests (Eisner and Beiring, 1994; Mendelsohn and Balick, 1995). Within the last few years a number of partnerships have been formed to try to develop this potential to the point where new drugs, derived from naturally occurring compounds, are on the market. Three models can illustrate how "bioprospecting" is evolving, examine what forces are shaping this field's evolution, and suggest how significant bioprospecting may become as a source of financing for biodiversity conservation.

The first model is illustrated by the now-famous collaboration between Merck and INBio (Sittenfeld and Gámez, 1993). Their agreement gives the international drug company access to material from which compounds are extracted and screened using various bioassays to see if the compounds have useful properties. Those compounds with potential would then enter the long process of animal and human trials and certification before they became a profitable product. INBio coordinates the collection of material and the initial stages of extraction of compounds. Merck will support enhancement of INBio's capacity to carry out its work as well as donate a portion of the profits from any successful drug as royalties to INBio.

Building on this model, three agencies of the US Government (NIH, NSF, and USAID) have granted \$2.5 million to five different consortia for support of five-year screening efforts. These

consortia involve major international pharmaceutical firms such as Bristol-Myers Squibb, Monsanto, and American Cyanamid as well as a newer company dedicated to natural product drugs -- Shaman Pharmaceuticals. The concept is to discover and develop pharmaceuticals from natural products as a means to promote economic growth in developing countries while conserving the biological resources from which these products are derived (National Institutes of Health, 1992).

It is hoped that significant income for conserving biodiversity would be generated if one of the extracted compounds leads directly to a profitable drug. In that case the for-profit company would pay a royalty to the partner institution in the country where the original plant or animal species is found. While the drug companies consider the percentage of profits paid as a royalty to be a corporate secret, the percentage would likely be in the range of 1 to 3% of the net profit (see Reid, 1992) *after all costs* -- testing, trials, marketing, advertising, equipment, etc. -- had been deducted from the income from sales.

This arrangement has considerable financial limitations. Significant income will only come if a drug company discovers a "blockbuster" drug with wide demand and a high price. Even if this research leads to a drug comparable to AZT (for AIDS) or Mevacor (for cholesterol), the small percentage of the profit paid as royalties will limit the total return to the country of origin to a few million dollars per year. Far more likely is a drug with a much more limited market value paying much less in royalties.

A second limitation is that the income from royalties would only materialize after the lengthy process of drug trials and approval, the expense and financial risk of which gives the drug companies' justification for the small percentage of profits returned as royalties. Another difficulty of this model is that, even if income is generated, it would have no direct link to the lives and livelihoods of the peoples living in the forests. Without a more immediate incentive clearly linked in the minds and wallets of these peoples with conservation, they may clear-cut the forest for short term gain by the time this kind of drug research begins to pay -- even while they are cooperating with agencies like INBio in the collection of material and correlation with its traditional use by indigenous peoples.

A second model improves on some of these shortcomings. Shaman Pharmaceuticals was formed to conduct bioprospecting. The most fundamental difference is that Shaman has no other business than bioprospecting. By contrast, the large drug companies are likely to continue to see the largest natural source of testable compounds to be those derived from microbes (e.g., penicillin, Mevacor), interesting species of which may occur as frequently in habitats like the soils of parking lots and golf courses as they do in rainforests. Also, large companies can afford to write off expenses of a limited investment in bioprospecting against the public relations value of media coverage linking a giant company to rain forest preservation. By contrast, Shaman will prosper only if it finds marketable drugs.

Shaman has raised more \$100 million in capital and has taken out patents on two drugs, which are now in clinical trials. A key feature of Shaman's approach is to focus on drugs from species that indigenous peoples believe to be efficacious. A second feature is that Shaman pools risk and profits among all its indigenous cooperators. Shaman has also established the Healing Forest Conservancy, a non-profit organization that will channel a portion of the profits directly to cooperating indigenous peoples. However, as in the case of more traditional drug companies, Shaman considers the exact percentage to be paid as royalties to be a corporate secret.

A third model is offered by an even newer company dedicated to bioprospecting -- Andes Pharmaceuticals. Andes, like Shaman, is dedicated to bioprospecting in cooperation with indigenous peoples. However, the Andes approach builds capacity to screen biological materials for useful drugs in the country of origin of the material being tested. Andes has signed agreements with several South American universities and NGOs to transfer state-of-the-art screening technology, including bio-assay guided fractionation, to laboratories in the country where species are being collected. In this case not only would the country benefit from the institution building, but what had been costs (for screening) subtracted from possible profits would become income to

the institution. Moreover, because the developing country institution and company would hold the patent, a much more substantial percentage of the ultimate value of the drugs (rather than a 1 or 2% royalty) would stay in the country of origin.

Even if all these models find success, the income streams will not be significant, by themselves, as a source of funding for conservation. At best these need to be seen as complements to other efforts that are more immediate and more lucrative. The private sector has a leading role to play in finding these more mainstream businesses (Acharya, 1995).

While bioprospecting may not generate significant income for conservation, it still has significant advantages for tropical countries. Involvement in bioprospecting partnerships with business can produce benefits which can contribute some incentive to conserve biodiversity; bioprospecting can help countries develop capacity to add value to their genetic resources; important skills can be developed in areas such as biotechnology and information technology; and bioprospecting can support, at least potentially, various conservation activities and lead to the development of jobs and products for local markets. Therefore, while it may be important in the long run to ensure income from a fair share of any royalties generated, the focus should be on short-term benefits such as capacity building and technology transfer, especially at the local level (see Figure 4).

On the other hand, bioprospecting as a source of funding has some significant problems. For an individual molecule or gene to make the slow and perilous journey from the wild to the medicine cabinet, cosmetic shelf, or seed packet, the contribution of a range of different stakeholders is required (ten Kate, 1995). These include providers (various departments of federal, provincial, and local government, managers of protected areas, local and indigenous communities, and private land holders), collectors (typically botanic gardens, university departments, research institutes, private contractors, or local and indigenous communities), and users (the pharmaceutical, seed, agrochemical, and biotechnology companies that will develop or market the final and various intermediate products, and local enterprises and individuals). Further, the final product may be a mixture of dozens of genetic and chemical ingredients emanating from as many countries, and value added through formal or informal research and development in all those places over thousands of years. Thus the exercise of quantifying contributions, and thus of apportioning and returning benefits, becomes exceedingly difficult.

Further, the combination of millions of species, numerous chemically distinct samples per species, and the potential to re-evaluate samples as new technologies become available creates a virtually infinite supply of biological resources. While this is good news for the biotechnology industry, it does not necessarily bode well for biodiversity conservation (Artuso, 1995). If the supply of biological samples can easily be increased to meet demand and if the available supply is replenished periodically as a result of technological change, the market price for biological samples is never likely to be much more than the cost of collecting them, so the owners of biological resources will receive very little surplus that could be devoted to conservation efforts. Selling biological samples for minimal current compensation and rather modest, highly uncertain and long-delayed royalties is unlikely to provide sufficient economic justification to protect ecosystems currently under threat.

Finally, as more countries enter the biochemical prospecting market with unique combinations of biological and technical resources for sale, market niches will become smaller and profits and conservation incentives can reasonably be expected to decline. But at least 48 companies or institutions are currently involved in bioprospecting activities, including such giant pharmaceutical firms as American Cyanamid, Bristol-Meyers Squibb, Eli-Lilly, Glaxo, Johnson and Johnson, Merck, Monsanto, Pfizer, SmithKline, Beecham, and Upjohn. Those who contend that bioprospecting is not likely to yield substantial profits are belied by the giant profit-making firms who clearly see the value in such biodiversity prospecting efforts.

With entry into force of the CBD, bioprospecting has become much more complicated. Today's prospector must meet requirements for prior informed consent, access on mutually agreed terms, the fair and equitable sharing of benefits, obtain appropriate visas and permits to collect, enter land, export and import materials, satisfy phytosanitary and CITES requirements, and ultimately meet

regulatory requirements for product safety and standards. Thus, bioprospecting depends for its success on the shared and realistic expectations of the partners and their ability to meet each other's needs. A very real danger exists that over-regulation will lead to a reduction in new exploration at the very time when biotechnology is facilitating the utility of such discovery.

FIGURE 4: HOW SUPPLIERS OF GENETIC RESOURCES CAN BECOME INVOLVED IN BIOPROSPECTING

MARKET OPPORTUNITIES: Become familiar with the range of sectors and markets to which it is possible to contribute:

- sectors: Prescription medicines; non-prescription medicines; over the counter and herbal remedies; veterinary products; food; new and improved crops and herbal remedies as food supplements; agrochemicals; new varieties for horticulture; cosmetics; biotechnology
- markets: Global, national, local

SERVICES REQUIRED: Consider the kinds of products and services needed in each sector:

- Genetic resources: raw materials; higher plants, algae, bacteria, viruses, fungi, animals (e.g., leeches, snakes, insects); processed materials; preparations, extracts of processed materials, e.g., dried, milled, frozen, extracted in various solvents
- R&D and information: observations on resistance of certain crops to disease, pests, drought, etc; ethnobotanical information on uses of medicines, information on indications, counter-indications, methods of preparation, dosages, prior experience on safety, and toxicity; results of screens; results of further R&D; fractionation and isolation, characterization and synthesis of a lead compound.
- Finished products: selling of patented compounds, processes or candidate drugs or other products; conducting toxicological, pre-clinical, clinical or other relevant trials, passing regulatory hurdles; manufacture and marketing of the finished product.
- Post-prospecting: supply of raw or processed materials for manufacture on an industrial scale (e.g. cultivation of medicinal plants or those used in cosmetics).

Source: after ten Kate, 1995

5.3. "Green" Business Investments in Biodiversity

World trade patterns are changing rapidly. Many environmental NGOs are lobbying for more study to understand possible environmental consequences of new trade regimes such as will be fostered by treaties such as NAFTA and GATT. These groups seek to use these agreements to promote globally uniform environmental impact assessment procedures and environmental management practices. Most groups have so far emphasized identifying new regulatory mechanisms capable of addressing environmental problems that will emerge with new trading patterns.

Advocates of mechanisms which extend developed country environmental regulations into developing country economies (NAFTA being the prime example) face the difficulty of implementation where the role of governmental agencies as watchdogs does not have a long history of effectiveness (Stavins, 1989; Jennings, 1995). The factors which inhibit governmental mechanisms from carrying out such a role effectively probably lie beyond the ability of treaty-based covenants to reach, much less address adequately. These factors include lack of trained professionals in government service, low public sector salaries, inadequate legal systems, poorly developed tradition of public interest advocacy or legal action, less than independent media, and the robustness (some might say greed) of a relatively unfettered private sector. The prospect for effective *governmental* regulation under such conditions does not look bright.

Already many environmental groups, recognizing the inadequacy of negative pressure, are trying to create positive incentives to influence the way new trading patterns, products, markets, industry, etc. interact with the environment (OECD, 1991b; Clark and Downes, 1995). Some of these examples are already becoming well known to the extent that they have captured a market niche. To name four: 1) Ben & Jerry's Ice Cream (with wild gathered nuts from the South American rainforest); 2) Banana Amiga (a green seal given by a consortium of U.S. and Costa Rica environmental NGOs); 3) Café Monteverde (a partnership for sustainable coffee production between Montana Coffee Traders, The Nature Conservancy, and the Monteverde Cooperative -- Costa Rican coffee farmers near Monteverde); and 4) vegetable ivory (a material for buttons and jewelry harvested sustainably in rain forest buffer zones in South America by indigenous people in conjunction with Conservation International).

Most schemes depend on marketing trust in a plausible environmental benefit along with the product. Local and/or international NGOs can play a role in certifying the sustainability of the effort. Local producers agree to abide by certain rules in exchange for the green seal imprimatur of the environmental NGO(s).

Key to the success of these arrangements is the turning of environmental concern into an incentive to an entrepreneur to assume a financial risk. Most examples have resulted from unusual initiatives often traceable to the vision of a single entrepreneur or field worker. Few, if any, have come from business-as-usual activities of local private companies. To encourage such creativity on a larger scale will require a more accessible framework for structuring the deals and efforts to reduce the risk to all parties involved.

At the moment each participant in such a sustainable marketing scheme is assuming risk well beyond what is traditional in their own sphere. Environmental groups who endorse or sponsor "sustainable" schemes or investments risk damage to their fund-raising activities which might come from publicity about a failure. Marketing entrepreneurs risk loss of their market share if they lose an endorsement. Local producers and farmers risk loss if their investment fails to allow them to penetrate a new market which would give them a higher selling price. Local groups (e.g. farmers cooperatives, community organizations, local NGOs) risk loss of future grants from donors.

A national environmental foundation or trust could help lessen all these risks and hence improve the climate for the growth of sustainable use of resources by the private sector. To play this role a trust would have to provide a home at the national level for local groups and scientists dedicated to sustainable use of natural resources. A trust could accomplish this task by committing to a long-term programme to strengthen the capacity of key local groups and institutions as well as by providing oversight through the monitoring of its grantees. In combination the trust could help lessen the risk of private investment in sustainable activities by certifying the claims of all involved in a sustainable scheme. Such a service would have a great potential value, which could be the basis for generating income.

Trade in sustainable products could lead to income or capital increases for national trusts/endowments in several ways. A straightforward idea could call for a few percent of the market value of each sustainable product to be donated to the endowment. For example Montana Coffee Traders donates \$1.00 per pound of coffee sold to a sustainable investment fund usable by

the Monteverde farmers cooperative with the approval of a local conservation organization and the Institute for Tropical Science which manages the cloud forest preserve. Another method might be through cooperative fund raising with international environmental groups.

A more difficult-to-create method of funding might be through direct investment of the assets of the trusts in joint ventures. Since this approach raises the potential of conflicts of interest, careful attention should be paid to defining the relationships among the various parties. One successful example of this dual use of money, investments and income, can be found in Fundación Chile (see Weatherly and Warnken, 1994). Fundación Chile was created as result of unique circumstances involving the expropriated assets of ITT. An August 1976 agreement between ITT and the US and Chilean governments resolved the dispute and created Fundación Chile with an endowment of US\$50 million in local currency. Fundación Chile's purpose is to stimulate agricultural exports through transfer and development of technologies and new business ventures to commercialize those technologies. Key to Fundación Chile's success was a close association with ITT for the first ten years -- an association which allowed Fundación Chile to make use of ITT's human resources, of which the most valuable were world-class managers and venture developers. Now Fundación Chile is fully independent in its finance and management.

If such a two-track approach to creating a framework of positive incentives for investment in sustainable production can be set up in the context of a national trust fund, then the potential to raise money could be enormous. One new source would be capital with social goals attached. The general public have an interest in investing in businesses with social and environmental benefits, and the managers of pension funds, church funds, university and foundation endowments, etc. have a desire to put part of their assets to work with social and environmental criteria. So far the growth of this kind of investment has been limited by the paucity of services available to certify the social and environmental benefits of investments. National trusts can provide a way to develop those services.

Many other possibilities also exist for providing incentives to the private sector. For example, the International Finance Corporation (IFC) has been developing a proposed \$20-30 million Biodiversity Enterprise Fund for Latin America. This would be a private equity fund to mobilize capital to invest in biodiversity-related projects such as alternative agriculture (organic farming, aquaculture, and the use of under-utilized species); sustainable forestry; non-timber products from forests and wildlands; ecotourism; biodiversity prospecting; pollution control; and other activities that restore or take development pressure off of biodiversity. The proposed Fund would be designed to bring together the investors, grant funds, and expertise and making them available to entrepreneurs.

The above discussion touches on just a few of the many possibilities for involving the private sector in implementing the Convention on Biological Diversity. Given the immense sums involved in the private sector, the dependence of many businesses in the private sector on biological resources, and the realization by many business leaders that their future, too, lies in sustainable development, the great scope for expanding the collaboration between the private sector and the CBD remains one of the most promising areas for improvement in the coming years.

6. FINANCING BIODIVERSITY: TOOLS NGOs CAN INITIATE

Conservation finance dates its history from the work of the NGOs that have been raising money and lobbying for conservation actively for at least a hundred years. It is largely as a result of the lobbying and advocacy efforts of NGOs over the past fifteen years that donors and governments have increased their support for conservation. NGOs are still in the forefront of innovation in bringing more investors and more financing to the support of conservation (WRI, 1989; Clark and Downes, 1995; Dillenbeck, 1994; IUCN, 1994; Norris, 1995; Spergel, 1993). The following describes tools that NGOs have been, and will likely continue to be, in the forefront of implementing, often in support of the efforts of governments and the private sector.

6.1. "Debt-for-Nature" Swaps

Debt-for-nature swaps are the best known of a family of deals that exchange debt in "hard" currency for local currency and or equity in local enterprises. The concept of debt swaps is described in many papers and reports (e.g., Gibson and Schrenk, 1991; Hansen, 1991; Rubin *et al.*, 1994). One key feature is worthy of emphasis: these swaps were a "win-win" deal for all involved. In a typical swap the commercial bank holding a non-performing note of a developing country was able to get cash (at a discount over face value) for the note and clear its books. The Central Bank that redeemed the note for local currency got out from under a portion of its debt. The donor, often a philanthropic foundation in the early days, got more impact for its grant money through a better rate of exchange for its donation for conservation. And the international NGO arranging the swap saw an increase not only in the local currency funding for its projects, but also in the number and amounts of donations to its programmes.

Two facts explain the sudden popularity of debt swaps. First, swaps generated a great deal of publicity in the mainstream press -- especially in places like financial journals where conservation programmes and activities of conservation NGOs usually do not receive much attention. Favourable press boosts fund raising in many ways that, though difficult to measure, pay handsomely -- not just for the NGO involved, but often for the commercial bank and debtor country. Debt-for-nature swaps generated a great deal of publicity for the international conservation NGOs, such as The Nature Conservancy, World Wildlife Fund and Conservation International, who pioneered them in the 1980s. Unfortunately, debt swaps, being no longer novel, do not generate the same press as they did five or six years ago.

Second, the developing country debt crisis was peaking when debt-for-nature swaps were first tried. Even though in the aggregate the total amount of debt "restructured" through debt-for-nature swaps was a small percentage of the needed debt relief, many countries welcomed their contribution for its symbolic value and were willing to tolerate what is, in effect, a two-tier exchange rate. Now, more and more countries in Latin America, at least, are well along an IMF-approved path toward stable economies and freely exchangeable currencies. Most improvement in the debt situation has been experienced by middle-income countries, while the majority of the poorest and most indebted countries are still unable to meet scheduled debt service payments, accumulating arrears at a growing pace. Since debts are serviced in hard currency and the only way for most of the poorest countries to raise hard currencies is to export commodities and natural resources, the debt burden is closely linked to the over-exploitation of natural resources.

Even where still possible, debt swaps can present significant difficulties. If Central Banks redeem notes by "printing money," then the impact of swaps could be inflationary. Debt swaps often take a long time to arrange. Making the deal itself has, in some cases, overshadowed the development of the programme to be funded by the swap.

6.2. Fund Raising from the Public

The general public also has a surprisingly generous willingness to pay for conserving biodiversity, provided appropriate means are available for them to exercise this choice. Traditionally, the usual way of expressing this support is through charitable giving, which sometimes can reach very significant numbers. For example, in the US, 1993 private sector contribution totaled US\$126.22 billion, including \$103 billion from individuals, \$9 billion from private foundations, \$8.5 billion from bequests and \$5.9 billion from corporate foundations. Of this impressive total to wildlife and environment issues amounted \$3.19 billion.

International NGOs have pioneered the art of fund raising targeted at a particular location, species, or issue. One example can be cited to show the kind of success possible. In the 1950s a group of US pacifists fleeing conscription in the Korean War settled in a mountainous region of Costa Rica and formed a dairy farmer's cooperative. Their cooperative established a cloud forest in Monteverde as a private nature preserve. Through television nature programmes shown in the US and Western Europe, Monteverde became a popular "eco-tourist" destination in the 1980s. In the late 1980s a Scandinavian school teacher visited Monteverde. When she returned home, she started

raising money to enlarge the Monteverde forest through land purchases. She helped found a targeted fund raising organization called the "Children's Rain Forest," or "Bosque Eterno por los Niños." Within a few years, this targeted effort was raising approximately \$6 million per year and employing 40 full time staff in their offices near Monteverde (Paul Weatherly interview 1992). Meanwhile, in large part because of their fund raising efforts as well as the efforts of more established conservation organizations, tourist arrivals at Monteverde had grown by more than 30% annually in the early 1990s.

Targeted fund raising works because it gives a sense of ownership to individual donors. Whether the cause is the jaguar or an island, a whale or a coral reef, contributors identify with the object. This success has created internal tensions within international conservation NGOs between scientific and field staff who understand that true security of biologically diverse resources depends on creating a sense of ownership among the people living in and around protected areas. Directors of fund raising campaigns have often, against the advice of field staff, allowed their fund-raising literature to imply that local people are the enemy of conservation, or at least indifferent bystanders, rather than its stewards. Literature of the Children's Rain Forest, at least until recently, pictured a photograph of six children, all blond Scandinavians, walking down a trail in Monteverde.

As countries continue to grow economically, targeted fund raising will see a burst of growth -- especially in countries where television programming is also growing. Campaigns targeted at specific species or locales could generate funds from the urbanized middle class but also could lead to tension between them and indigenous peoples living in the area targeted by the fund appeal. Developing strong financial support from the emerging middle classes without also worsening this tension is the challenge targeted fund raising faces. If this challenge is met, then countries showing high rates of economic growth may soon be able to raise substantial amounts of funding for conservation. The key to success is to have representatives of both funders and local communities involved in the control of flow of such funds.

The preceding chapters have discussed a number of funding mechanisms, each with their own advantages and disadvantages (Figure 5). Numerous other possibilities are certainly available and as conditions change in the future, perhaps even more will become feasible. The key lesson from this discussion is that funding need not be a limiting factor for implementing the Convention on Biological Diversity.

7. NEW INSTITUTIONAL APPROACHES TO MANAGING FUNDS FOR BIODIVERSITY

New institutions for managing funds for biodiversity are emerging at a rapid rate. Each country should develop institutions that are best suited to its own environment and consistent with its social and legal systems. This section discusses several opportunities whereby the various interested parties may come together to manage flows of resources that are secure in terms of their availability over time, and which enable local communities to obtain access to funds which are within national control.

7.1. Regional Approaches to Funding Biodiversity Projects

Cosslett (1995) proposed a regional approach to funding biodiversity projects, especially where transboundary environmental problems are largely of a regional nature (as in many coastal zones and international waters). He recommended establishment of Regional Marine and Coastal Environmental Funds (REMCEF) financed wholly or in part by revenues from economic instruments enacted at national levels. At least potentially, such funds could create a close linkage between levels of pollution-creating economic activity and remedial environmental spending, thereby helping to correct markets and conserve marine biodiversity.

FIGURE 5: ADVANTAGES AND DISADVANTAGES OF VARIOUS FUNDING MECHANISMS

Funding Mechanism	Advantages	Disadvantages
I. The International Governing System		
1. Changing for use of the global commons	<ul style="list-style-type: none"> • Potentially vast amounts of funds • User pays 	<ul style="list-style-type: none"> • Require international agreement difficult to attain • Needs new institution to manage funds
2. Joint implementation	<ul style="list-style-type: none"> • Large amounts of funds primarily for forest biodiversity • Links biodiversity with climate change 	<ul style="list-style-type: none"> • Requires unprecedented levels of coordination • Tacitly accepts continued high consumption of fossil fuels in North • Funds available only for direct forest management
3. International taxation	<ul style="list-style-type: none"> • Potentially vast amounts of funds • Can influence policies to be more supportive of biodiversity 	<ul style="list-style-type: none"> • May not be GATT-compatible; requires political will • Funds may be diverted to purposes unrelated to biodiversity
4. Funds from trade in tropical timber	<ul style="list-style-type: none"> • Could raise \$1.5 billion per year, with no effect on final product prices • Provides incentives for improved forest management 	<ul style="list-style-type: none"> • Consumer countries forego significant tax revenues • Needs internationally agreed monitoring and enforcement
II. Governments		
5. Taxes and charges	<ul style="list-style-type: none"> • Can generate significant funds with existing structures • Can build on "polluter pays" and "deficiary pays" principles • "Green" taxes can change consumer behaviour in favour of biodiversity without increasing total tax burden 	<ul style="list-style-type: none"> • Many governments resist hypothecated taxation • Tax payer resistance • Biodiversity-rich areas often distant from sources of funding
6. Tradeable permits	<ul style="list-style-type: none"> • Can generate funding in the billions of dollars • Can change behaviour affecting biodiversity • Specifies opportunity costs and provides mechanism for beneficiaries to pay them 	<ul style="list-style-type: none"> • Administratively demanding • Behavioural changes may last only as long as the payments • Difficult to translate to international level

7. Privatization and property rights	<ul style="list-style-type: none"> • Property rights gives responsibility to people living closest to the resources • Assigning shares of privatized state corporations to conservation endowments helps retain public accountability 	<ul style="list-style-type: none"> • Difficulty of government monitoring of resource management in remote areas • Why use for biodiversity instead of other needs? • Privatizing can destroy effective community-based management systems
8. Debt-related measures	<ul style="list-style-type: none"> • Can generate funds in national currencies and reduce (slightly) debt burdens 	<ul style="list-style-type: none"> • Some resentment of "conditionality"
III. The Private Sector		
9. Transfer of development rights and credits	<ul style="list-style-type: none"> • Involves private sector in joint implementation measures which may benefit biodiversity 	<ul style="list-style-type: none"> • Biodiversity benefits a side issue
10. Prospecting rights and biological royalties	<ul style="list-style-type: none"> • Significant funds could be generated by discoveries of new drugs or other substances from nature • Utility of biological resources can be increased, thereby providing incentives for conservation 	<ul style="list-style-type: none"> • Needs effective international agreements on intellectual property rights and royalties • Long lead time • Difficult for royalty income to reach field level • Bureaucratic complications may lead to over-regulation which stifles innovation and exploration
11. Green investments	<ul style="list-style-type: none"> • Private sector invests in biodiversity as result of enlightened self-interest • Funds generated regularly from sales 	<ul style="list-style-type: none"> • Weak capacity in some countries to regulate private sector • Requires appropriate incentives from government
IV. NGOs		
12. "Debt-for-nature" swaps	<ul style="list-style-type: none"> • Generates significant funds in national currency • Can be used to endow trust funds for long-term investment 	<ul style="list-style-type: none"> • Discounted debts now less available • Can be inflationary
13. Targeted fund-raising	<ul style="list-style-type: none"> • Allows public willingness-to-pay to be tapped in support of biodiversity • Can build strong alliance among NGOs, public sector, and private sector 	<ul style="list-style-type: none"> • Requires significant investment in fund-raising • Needs sympathetic government regulations, such as tax deductions

The following factors weigh in favour of the creation of such a regional fund as a source of grants and concessional loans for capacity building and investments in the region (Cosslett, 1995):

- The necessity and cost-effectiveness of working cooperatively towards common environmental quality objectives;

FIGURE 6: ADVANTAGES AND DISADVANTAGES OF NEW INSTITUTIONAL APPROACHES TO MANAGING FUNDS FOR BIODIVERSITY

Funding Mechanism	Advantages	Disadvantages
1. Regional funds	<ul style="list-style-type: none"> • Could form close link between activities generating pollution or other damage to biodiversity, and remedial environmental investment 	<ul style="list-style-type: none"> • Needs regional cooperation and acceptance of new "green charges"
2. Biotic exploration fund	<ul style="list-style-type: none"> • Considerable levels of funding possible 	<ul style="list-style-type: none"> • Needs intellectual property protection • Long delay between investment and return • who manages the fund?
3. National funds	<ul style="list-style-type: none"> • Creates mechanism for long-term funding needs • Gives control over donor funding to local institutions • Can manage significant funds - over \$500 million by end 1995 	<ul style="list-style-type: none"> • Problems with earmarking • Sometimes high overheads
4. Trust funds	<ul style="list-style-type: none"> • Allows support for diverse activities, often with small amounts of funding • Can support recurrent costs • Can promote co-funding and cooperation among many groups 	<ul style="list-style-type: none"> • Overheads can be high and returns low, with insufficient funds reaching the field • Requires significant investment in design and governance

- the need for relatively large investments over a period of time within the framework of a comprehensive regional action plan which provides clear policy guidance for such investments;
- the probability that funding likely to be forthcoming from the riparian countries is likely to be insufficient;
- that economic instruments can be mobilized to provide a significant part of the capital for the fund, which would enable the source of finance to be sustainable;
- the probability that the fund would lead to enhanced coordination between the various sources of finance, including regional and local governments, donors, and commercial lenders.

Possible sources of financing for such a regional fund are the polluting and resource-depleting activities which are being undertaken within the coastal areas surrounding regional seas. These include:

- transport levy on shipping, which might take the form of a risk-based user fee involving a levy per ton of cargo linked to the amount of risk created by various kinds of cargo (these could be collected as part of the port fees paid by ships upon their departure from port);
- extraction fees, based on the expected value of damages associated with accidents related to the extraction of non-renewable resources such as oil, gas, and sand, in the region;
- a fisheries fee, levied upon capital employed in the fishing industry (this would have the added benefit of helping to reduce the over-capitalization of the fishing industry);

- a bonding scheme for hazardous materials, which would require ships transporting hazardous materials to post a bond for the cost of cleaning up after an accident, with the amount of the bond varying with the environmental risk of the cargo; interest from funds deposited in the bond account would accrue to the environmental fund.

7.2. A Biotic Exploration Fund

Eisner and Beiring (1994) proposed the establishment of a "Biotic Exploration Fund" to develop contractual arrangements between the holders of biodiversity and those parties wishing to screen these organisms for biological and chemical activity.

At present, no intellectual property protection is provided to biodiversity resources found in nature (Reid, 1992). Thus individuals and countries engaged in developing their land resources will tend to ignore the potential value of the existing habitat as a repository for potentially valuable resources; if they cannot control the return on the investments required, then the investments are unlikely to be made.

However, based on experience in Costa Rica, Mexico, and elsewhere, it is possible that the right to simply examine biotic resources and screen for potentially marketable biological properties can command a price, thereby enabling the biodiversity-rich countries to reap both the benefits of resource use and compel the users to pay for the costs of biodiversity protection. Such agreements recognize the value of simply having and preserving biodiversity, providing a sort of patent-like form of protection for plants and animals in nature. This is very much in tune with the Convention on Biological Diversity in that it ensures adequate compensation to the providers and protectors of genetic resources. Such a contractual system has the added benefit of not requiring government coercion of private parties. Further, transaction costs are low enough and benefits high enough to make both parties eager to enter into the deal.

The existence of a biotic exploration fund would give intellectual property rights to biodiversity *de facto*, because countries rich in biodiversity would have the bargaining power to insist on payment for access to their resources. Organisms could be screened locally for anti-tumour, anti-fungal, anti-bacterial, and anti-parasitic activity, and could be rated according to their chemical promise. Intrinsic advantages to having organisms screened near their source include freshness and building the scientific capability of developing nations. The proposal is to establish the biotic exploration fund with holdings in the amount of \$250 to \$500 million. It would be administered by a non-profit organization which would have discretionary power over disbursement of the funds and would broker the chemical prospecting agreements between the biodiversity institutes and industry. Such a fund is closely linked to bioprospecting, discussed in more detail in section 5.2.

7.3. National Funds

While international sources of concessionary loan finance and grants for environmental projects are growing, as indicated by this paper, some parts of the world are unable to take full advantage of this opportunity because of the lack of capacity to prepare externally-financed projects. This also tends to leave decision-making in the hands of the donors rather than the recipients. Further, appropriate institutional mechanisms for channeling donor financing are necessary to enable efficient use of these resources. Where such institutional arrangements are lacking, this can constitute a much more severe constraint on investment in biodiversity than the potential availability of finance. Recognizing this problem, some countries have established their own national environment funds to deal with such challenges.

A national fund does not have to have an endowment nor does it have to be governed as a trust independent of the government (IUCN, 1993; 1994). The Government of Bolivia established a national fund, named FONAMA, as a mechanism to coordinate donor support of environmental activities that inevitably cut across sectoral and ministerial lines. The Government credits FONAMA with an increase in donor support for environmental programmes in Bolivia. Donors

responded to FONOMA because it offered an easier way to form multisectoral programmes and to see how their funds were having an impact. Given their success with FONAMA, the Bolivian Government is now seeking donor support to create an endowment for FONAMA so that it can begin to play the role of an in-country environmental donor, i.e., a foundation.

As discussed below under the heading of trust funds (7.4.), the idea of a permanent, or very long-lived, source of support dedicated to environmental and conservation goals has arisen in a variety of ways. Donors have been one of the primary sources, including both bilateral sources and the Global Environmental Facility (through the GEF implementing agencies of the World Bank, UNDP and UNEP). Such funds are a good investment from a donor's viewpoint for a number of reasons. IUCN (1994) suggests that donors should support national funds because such funds:

- create a mechanism for long-term funding needs of environmental efforts which either require a long time to accomplish or which need perpetual support;
- nurture democracy by empowering societies by providing independent analysis and open discussion of national policy issues and priorities;
- make career commitments attractive to future leaders by providing assurance that key institutions and priorities will receive steady support over the long term;
- stimulate responsibility (at the grassroots and at the national level) by providing a indigenous source of aid over which beneficiaries have greater control;
- break dependency on foreign aid by providing a source of funds under national management; and
- promote fiscal responsibility and good governance by creating a "foundation ethos" built upon explicit checks and balances which in turn create incentives for accountability.

IUCN surveyed the field of national funds, most of which have an endowment, in 1993, identifying more than 23 national funds with assets in excess of US\$350 million, mostly in local currencies (IUCN, 1994; Frothingham and Dillenbeck, 1994). Since this survey, the amounts have continued to grow and are expected to exceed US\$50 million by the end of 1995. The Global Environment Facility has more than twenty endowments under discussion.

From a donors' perspective, endowed national funds meet a number of needs. On the one hand many donors, especially multilateral ones, are under steady pressure to support "sustainable development." While only a very broad consensus has been reached on what is "sustainable," most of the environmental NGOs and other groups agree that for development to be sustainable it must be participatory and democratic in the sense that societies are given more control over their own futures. National funds can provide a part of the answer to the sustainable development question (Dillenbeck, 1994).

7.4. Trust Funds

As the tool of "debt-for-nature" swaps began to become widespread in many cases the proceeds of swaps sometimes greatly exceeded the availability of ready-to-start projects. Consequently many swap arrangers sought to "bank" the swap's yield of local currency in interest-bearing accounts and draw them down over a fairly long time, i.e. create a kind of sinking fund. At the same time, the GEF was being asked to develop new approaches to sustainable funding for their biodiversity projects (Newcomb, 1995).

Around 1990 the idea of using these "windfall" amounts of money to endow a permanent trust or foundation that would fund biodiversity-related activities of NGOs as well as government agencies arose in separate instances. Trust funds have several advantages to some of the persistent problems in funding biodiversity projects:

- more diverse types of activities can be funded than is usually possible with more conventional mechanisms;
- long-term funding can be established and recurrent costs can be met;
- capacity-building is fostered;
- administration of small sums becomes more feasible, as financial flows are adapted to absorptive capacity;
- co-financing possibilities are expanded and facilitated.

Osgood (1995) suggests that the bare minimal viable size of a trust fund is US\$5 million, but a more realistic minimum size is US\$10 million. The ideal is when the capital held by trust funds is invested in industries or other institutions whose operations are supportive of the objectives of the Convention on Biological Diversity.

In some countries, NGOs are playing a significant role in establishing national environment funds and small grant facilities that are based on the idea of fostering collaboration among donors, the government, NGOs, and local communities. The intention is to empower local communities and support their initiatives based on the following assumptions in terms of roles and capacities:

- the appropriate role of government is to provide leadership while involving other partners in policy formulation and implementation;
- the track record of NGOs demonstrates that they can influence policies positively and are effective at assisting local communities in the design and implementation of their initiatives; but financial resources limit their effectiveness;
- local communities have relevant indigenous knowledge, organization and manpower but lack financial means and sometimes technical knowhow. They are the ultimate beneficiaries and should be the principal implementors of activities.
- The traditional role of donors is to fund government initiatives, but increasingly they are also funding NGOs and community organizations based on priorities defined by the government.

Experience with endowments and trust funds (see Weatherly and Warnken, 1994; Mikitin and Osgood, 1994; Rubin *et al.*, 1994; Spergel, 1993) indicates that creating a successful "permanent" institution requires more attention to questions of governance than do time-limited projects. Governance issues are qualitatively different than typical project management issues. In a five-year project if a fundamental issue such as the lack of participation of a local population arises, an easy "out" often taken is to postpone addressing the issue until a follow-on project. Endowments have no follow-on so all fundamental issues need to be a part of the design process.

Endowments need forms of governance that local people consider "legitimate." An example from recent events may serve to make the point. The Mexican biodiversity trust mentioned above will likely focus many of its activities in the tropical forests of Chiapas state, the scene of an armed rebellion of indigenous peoples seeking greater control over land and resources. The organizers of the trust face the difficult task of striking a balance between having enough representatives of the affected indigenous groups to be legitimate in local eyes while still having national and global viewpoints adequately represented.

FIGURE 7: ADVANTAGES AND DISADVANTAGES OF VARIOUS KINDS OF TRUSTS

Trust	Advantages	Disadvantages
1. Domestic Trust	<ul style="list-style-type: none"> • Functions under laws of country of beneficiaries • Builds domestic capacity in trust management and financial management • Perception of national ownership can raise awareness of and build commitment to environmental issues • Strengthen democracy by stimulating dialogue between NGOs and Government 	<ul style="list-style-type: none"> • Perception that funds belong to Government and could be used for other government programmes (avoided in the Bissau case) • Political instability and corruption can threaten trust objectives and safety assets • Legal status may not meet requirements of outside non-profit organizations • Risk of devaluation of local currency (CFA zone)
2. Offshore trust with offshore asset management	<ul style="list-style-type: none"> • Investment in hard currency in a secure market and location • Access to top professional asset managers • Provides legal structure for countries where legal system does not accommodate a trust arrangement • Increased donor confidence • Ability to transfer assets to another location, if need be 	<ul style="list-style-type: none"> • Risk of Attachment; money could be legally seized by commercial creditors • Lost opportunity to build domestic financial and asset management capabilities • Lack of ownership, create dependency • Loss of control
3. Trust based in a multilateral agency	<ul style="list-style-type: none"> • Tax-exempt status • Absolute security of assets • Protection from attachment • Ability to place assets in a tax haven without negative perception sometimes associated with such a situation • New potential: possibility to link fund capitalization to multilateral debt conversion 	<ul style="list-style-type: none"> • Additional layer of administrative costs and delays • Long-term involvement of outside agency • Lost opportunity to build domestic capacity for asset management • Fee arrangements and conservative investment practices can lower potential returns • Loss of sense of national ownership and control

Other lessons learned include the necessity of explicit and robust checks and balances. The model for many trusts comes from developed countries where government and public interest groups have a long experience with a legal framework governing the management of these trusts or foundations. In countries without such a strong tradition, trust creators will have to construct a framework of incentives to good governance within the agreement with the government that grants independence and tax privileges to the trust or foundation. Together this framework of governance and the character of the foundation's staff and board members lay the groundwork for the growth of a foundation ethos.

One way to create an incentive to good governance lies in committing the trust or foundation to growth through fund raising both from national and international sources. The foundation will only be successful in raising funds if it maintains a reputation of being effective and accountable.

The four institutional approaches outlined above have their own advantages and disadvantages. As with funding mechanisms, these institutional approaches are indicative and will certainly require adaptation to local conditions and requirements. The main point is that the Convention on Biological Diversity provides new opportunities for innovative thinking about how to mobilize policy changes, funding, and public support for enabling people to live in balance with the available biological resources.

8. POLICY CHANGES REQUIRED TO FACILITATE NEW SOURCES OF FUNDING

This section suggests several policy changes that could facilitate new sources of funding in support of biodiversity.

8.1. Endow National Foundations

Key to the future of biodiversity financing is having a vehicle to build a national consensus on overall environmental priorities. Such institutions must have a broad mandate from civil society to be able to work with public sector agencies to set national goals for biodiversity as well as other environmental needs. The concept of a national foundation as described in this paper would be to serve as a partner of "green" business by certifying the environmental and social benefits of businesses whose sales require customer (or investor) confidence. Further, a national fund patterned along the lines of Fundación Chile would be able to play a leading role in leading the private sector down paths of sustainability by using its capital to create ventures that both make a profit and use resources in a responsible way.

8.2. Change Laws to Encourage Fund Raising

The general public is often very interested in conserving biodiversity but lacks any effective means of demonstrating their preference, except perhaps through increased purchase of "green" products. But given appropriate structures, the general public will often be extremely generous in their support of conservation, especially through conservation-related NGOs. In order to tap this potential, governments and donors need to examine laws and regulations governing the activities of the non-profit private sector. Partnerships with for-profit concerns should be encouraged and regulated. Tax breaks for charitable contributions need to be instituted or enhanced. The goal is to make the non-profit sector as dynamic and innovative as the for-profit sector.

8.3. Build Institutional Capacity to Obtain Sustainable Income

Investors supporting biodiversity conservation need to commit to a ten- to fifteen-year programme of building institutional capacity to support biodiversity conservation. The needs are broad. Examples include: more effective institutions to manage protected areas; institutions to certify "green" investments; laboratories to develop commercial drugs; and ways for indigenous peoples to participate in and benefit from decisions over the use of biologically diverse resources and their products.

8.4. Encourage Investment by the Private Sector

The private sector is often discouraged from investing in biodiversity because of high levels of market and political risk, high initial capital costs, returns that are earned in the distant future, and difficulties in implementing user charges due to high exclusion costs. Private investors need to be provided with appropriate incentives, such as security of tenure, appropriate contractual relations, the removal of perverse economic incentives, correction of distortionary policies, and removal of barriers to entry.

8.5. Implement Full-Cost Pricing

One of the reasons that biological resources are over-exploited is that the full costs of their exploitation are not reflected in their prices. In other words, the general public is subsidizing over-consumption of these resources, as the price signals of over-exploitation are lost in the noise of marketing, subsidies, and global trade. In order for the public to make informed choices, and for the market to play its appropriate role, prices must accurately reflect the full costs of exploitation. Thus governments should initiate dialogue to ensure international agreement to full-cost pricing as a means of changing consumer behaviour and thereby reducing pressure on biodiversity. While this would not necessarily raise funding directly for biodiversity conservation, it would be an effective indirect support which will mean that less funding is required.

8.6. Build Public Support for Biodiversity Conservation

Many of the policy changes and innovative funding mechanisms are built on public support, which will be forthcoming only if the public has a good understanding of the issues, costs, and benefits. Public support for these measures will make them politically acceptable and increase the return (in terms of public approval ratings and consumer support) to sound and innovative environmental behaviour by the private sector.

8.7. Incorporate a Funding Strategy in National Biodiversity Strategies and Action Plans

Article 6 of the CBD calls for the preparation of national strategies and action plans as well as the mobilization of national and international funding to support the objectives of the Convention. As an integral part of these plans, those preparing them should include a section on financing mechanisms to deal explicitly with the many opportunities suggested in this paper, and others which may be appropriate at the national level.

9. CONCLUSIONS: WHAT IDB CAN DO

The main problem in financing biodiversity conservation is not just finding additional finance but identifying the most suitable and equitable economic instruments. Instruments that enable full costs of exploitation to be included in prices would be especially important in conserving biodiversity. Such incorporation of full environmental costs into prices paid for commodities can have a profound effect on biodiversity. Meeting the two conditions of full-cost prices and not reducing the export earnings of developing countries could build on partnerships between producers and consumers of a given commodity, perhaps through informal commodity roundtables for internalization of costs or international commodity-related environmental agreements.

More funds are required for supporting government efforts to implement the Convention on Biological Diversity (CBD), and this paper has indicated the breadth of opportunities for innovative sources of funding, and the kinds of policy reforms required to enable the new funds to be effectively applied to biodiversity problems. The major requirements, and possible roles for IDB, include:

- **Requirement:** Establish new policy frameworks that will facilitate innovation in fund-raising for biodiversity-related topics. **Possible IDB roles:**
 - * *Mainstream biodiversity concerns within IDB's regular development operations, especially by promoting the creation of incentives for conservation of biodiversity and sustainable use of biological resources (including incentives related to property rights regimes and creation of markets for biodiversity products);*
 - * *Develop and apply new approaches to financing conservation of biodiversity as part of conservation programmes, including National Environmental Funds, economic and social incentive measures, etc.*

- **Requirement:** Reduce expenditures that tend to operate in ways contrary to the objectives of the CBD. **Possible IDB roles:**
 - * *avoid establishment of perverse incentives; promote removal of such incentives where they exist; establish and implement environmental impact assessment and mitigation procedures that incorporate biodiversity concerns.*
- **Requirement:** Design new approaches for raising and spending money effectively for achieving the objectives of the CBD. **Possible IDB roles:**
 - * *Promote and develop approaches, methodologies and technologies for sustainable use of biological resources as part of conservation programs or other sectoral IDB operations, in association or independently from protection activities; develop a special focus on the role of biological diversity in contributing to sustainable development, including by promoting human well-being and helping to alleviate poverty.*
 - * *Include biodiversity issues into IDB's sectoral planning and policy development processes, paying special attention to the biodiversity strategies and action plans developed to help implement the Convention on Biological Diversity.*
 - * *Encourage resource mobilization and leverage of additional resources to complement IDB's loans and concessional grants; define plans to ensure financial sustainability especially in ex-post phase of conservation programmes.*
 - * *Ensure coordination between IDB's conservation activities with other projects developed in the region, such as GEF projects, to avoid duplication and/or lack of coherence and to promote complementarity between such projects; promote exchange of experience between these projects.*
- **Requirement:** Build capacity to use economic instruments to promote conservation of biodiversity. **Possible IDB roles:**
 - * *Promote exchange of experience in the development and application of economic instruments, as well as of other activities within conservation programmes, and communicate results to broader audience.*
 - * *Increase capacity building in conservation programs, including strengthening institutions responsible for implementation of IDB's programmes and training programmes for staff and relevant stakeholders.*
- **Requirement:** Build broader support for biodiversity conservation. **Possible IDB roles:**
 - * *Ensure broad participation from relevant stakeholders in conservation programmes such as protected areas management and sustainable use and biodiversity protection programmes outside such areas, including in their management and monitoring activities; ensure participation in biodiversity projects of governmental officials from environmental and other sectors such as Finance, Agriculture, Forestry, Tourism, and others, as well as NGOs, indigenous groups, and grass root organizations.*
 - * *Ensure that programmes that include bioprospecting activities or other uses of genetic resources have procedures to ensure the involvement of owners of resources and knowledge, prior informed consent from these owners, and arrangements for benefit*

sharing.

This paper has argued that conserving biodiversity requires a combination of policy reform and appropriate economic instruments. The policy reforms would remove the underlying causes of the loss of biodiversity and create incentives for the efficient use of biological resources. The economic instruments will further strengthen the incentives for behaviour which is supportive of the objectives of the Convention on Biological Diversity and will generate the additional financial resources required to fund investments in biodiversity. The international policy environment established by the Conference of the Parties of the CBD will condition the outcome of national policy reforms as well as the incentives and revenues generated by the introduction of the economic instruments proposed.

Obviously, some innovative measures will be easier than others. It would seem reasonable to start with policy options and financing instruments that promise win-win outcomes, followed by those that would raise at least sufficient revenue to be self-financing. Environmental investments that clearly involve net additional costs should be done last and in increments, with full assessment of the trade-offs involved. Finally, full-cost pricing may take 10 to 20 years to implement if the process were to be started today, but what counts is the effect of a commitment to full-cost pricing on the formation of expectations of investors, producers, and consumers. Taken together, the policy changes, innovative funding mechanisms, and expanded partnerships with the private sector will greatly enhance the prospects for implementing the Convention on Biological Diversity. The IDB can play a critical role in helping to design and implement this package of measures.

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ACKNOWLEDGEMENTS

This paper grew out of work done by IUCN in the field of conservation financing over the past several years. It builds upon work done with Paul Weatherly in preparation for the IUCN-Asian Development Bank Conference on "Biodiversity and Conservation in the Asian and Pacific Region" held in June 1994. It has been further enriched by contributions to a workshop organized by IUCN and CSERGE held in Zimbabwe on 12-16 September 1995. Special thanks go to David Pearce, Ed Barbier, Tim Swanson, Juan di Castro, Kathy MacKinnon, Kerry ten Kate, Dhira Pantumvanit and Theo Panayotou for their stimulating comments. Frank Vorhies, Martha Rojas, and Alain Lambert at IUCN also provided useful material. Applying this global perspective to the particular circumstances of the Inter-American Development Bank was made possible by a grant from IDB.

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**ACHIEVING FINANCIAL SUSTAINABILITY IN
BIODIVERSITY CONSERVATION PROGRAMMES**

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